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Via facsimile only to: 0049 89 2399 4465
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Date 24 November 2005
Your ref.
Our ref. P200302048 WO JMW/TIJ

Dear Sirs,

International Patent Application No. PCT/DK2005/000019
LM Glasfiber A/S

Referring to the International Search Report and the Written Opinion of the ISA dated 23 June 2005 we hereby file a Demand for International Preliminary Examination, cf. the enclosed Form PCT/IPEA/401. At the same time we kindly request the Examiner to consider our following comments:

Closest prior art:

Prior art referred to in the present response comprise:

D1: US 4 183 993 (Benstead et al.), and

D2: GB 1 275 705 (De Vlam).

As D1 is the document having the largest number of technical features in common with the present invention and being capable of performing the function of the invention, D1 is considered as the closest prior art.

Objections in the communication

The objections in the Written Opinion relate to lack of novelty and inventive step of the claims in the present patent application (Article 33 (1-3) PCT) compared to the prior art as cited above.

Amendment

In response to the objections raised, the validity of which is not conceded, we attach new claims pages to replace the corresponding existing pages, which are now cancelled, without prejudice to the later filing of a divisional application directed to any

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aspect of the subject matter thereof. These amendments are believed to render moot all those of the examiner's objections, which are not otherwise dealt with below.

The independent claims 1 and 16 have been amended in order to detail the invention and distance it from the prior art.

The description of the claims has been brought into conformity with the amended claims.

Novelty

The new amended claim 1 and 16 thus reads as follows:

1. A method of manufacturing a fibre mat adapted for use in the manufacture of a fibre-reinforced device, said fibre mat comprising at least two essentially longitudinally extending and parallel batches of fibres, wherein the method comprises that the batches are joined by holder means that span each batch at an angle in such a manner that the holder means impart an influence to each batch which influence is essentially symmetrical about an axis situated longitudinally between the batches.
16. A fibre mat adapted for use in the manufacture of a fibre-reinforced device, which fibre mat comprises at least two essentially longitudinally extending and parallel batches of fibres, where the batches are joined by holder means that span each batch at an angle, whereby an influence is imparted to each batch, said influence being essentially symmetrical about an axis situated longitudinally between the batches.

The underlined amended wording 'at an angle' does not change the description of the invention itself, but merely emphasizes the field of the invention and is fully supported by the application as filed e.g. in the description to the figures 1-2, 4-5, 7-12. Since all the features of the amended application are directly and unambiguously derivable from the application as filed, it is submitted that there is no contravention of Art. 19(2) PCT.

D1 discloses a fabric of unidirectional fibre bundles for reinforcing laminates. The parallel fibre bundles extending longitudinally are held together or connected by a multiplicity of weft knit stitches. The threads are crossing the bundles transversely and travel from one side of the fabric to the other. One thread passes over the bundles, and the next thread passes under while linking to the preceding thread in the spaces between to neighboring bundles. The document does not disclose the feature of the amended claims 1 and 16 that the threads (the holder means) span the bundles or batches at an angle. Claims 1 and 16 are therefore novel over D1.

Since claims 2-15 and 17-26 are dependent on claim 1 and 16, respectively, and include all their features they are therefore also novel over D1.

D2 describes a fabric made of a number of parallel batches of fibres connected to one or more other layers by threads making zig-zag or tricot stitches. The zig-zag stitches

run alike over one bundle and its neighbors, why they are of the unsymmetrical type in the sense that they do not 'impart an influence to each batch which influence is essentially symmetrical about an axis situated longitudinally between the batches'. The document hence do not disclose any fibre mat or method of making one which contain both features of the claims 1 and 16 of both spanning each batch at an angle and in such a manner that the threads influence the bundles essentially symmetrically about an axis situated longitudinally between the batches. The claims 1 and 16 are therefore novel over D2.

Thus, the applicant respectfully submits that this new subject matter is not disclosed in the references and that the amended claims 1 and 16 are novel (Art. 33(2) PCT).

Inventive step

As mentioned above D1 is taken to be the closest prior art since it is the document having the largest number of technical features in common with the present invention and is also capable of performing lightning protection of a wind turbine blade as is the invention.

D1 differs from the claims 1 and 16 by not having holding means spanning the fiber batches at an angle.

These technical differences lead to the following differences in properties:

- In the knitted structure in D1 the weft threads go from one side of the fiber mat to the other, whereas the holding means spanning the bundles at an angle in the present invention opens up for threads meandering along in the length of the bundles. This leads to the advantage that a multiplicity of needles can sew the bundles together in parallel yielding a faster production method.
- Further, as the threads run essentially in the length of the batches a fiber mat can easily be cut into smaller pieces as needed in the manufacture of some laminate without fraying or unraveling. This is not the case where the threads (as in D1) cross the bundles transversely. Here several bundles of fibres will become free if a mat is cut into smaller dimensions leading to the need for bigger tolerances on the measures along with material waste.
- In order to fully exploit the good stiffness and strength properties of the fibres in the bundles it is of outmost importance that the fibres and hence the bundles are actually kept straight and do not curve in any direction because of the holding means. The zig-zag stitches are favorable over the transverse holding means by preventing the bundles from buckling up and down out of the plane of the fiber mat. In the knitted structure of D1 a batch of fibers will clearly bulge up and curve up and down along its length because of the transverse stitches.

- Further, a thread at an angle is advantageous as it will not press a fibre bundle down as hard as a thread going transversely to the bundle as the forces from the thread at an angle are distributed over a longer distance.
- This also leads to better damage or strength properties for a mat being held together by zig-zag stitches as the otherwise concentrated loads from the transverse stitches leading to early fiber breakage are avoided.

The objective technical problem to be solved by the invention as claimed in the amended claims 1 and 16 is therefore to obtain a fibre mat of longitudinally extended and parallel bundles joined with holding means so that the longitudinal direction of the bundles are not affected by the holding means.

The invention of claims 1 and 16 solves this problem by letting the holder means span each batch at an angle. Also, the holder means are guided in such a way that they influence each batch essentially symmetrically about an axis situated longitudinally between the batches whereby the bundles are kept straight.

There is no suggestion or indication in D1 to let the threads cross the fibre bundles at an angle. Also the knitting technique applied in D1 cannot be combined with zig-zagging threads as the first relates to a pattern of weft threads and the second to a pattern of threads going essentially in the warp direction.

Similarly, a person skilled in the art would not combine the prior art of D1 and D2 as the knitting (D1) and sewing (D2) techniques are very different and with different production machines used.

The invention of claims 1 and 16 is therefore not obvious over any of the prior art documents, either taken alone or in combination and hence must be considered as involving an inventive step (Art. 33(3) PCT).

The dependent claims, depending from allowable independent claims, must also be considered allowable.

Further, as the fibre mat according to one or more of the claims 16-26 contains an inventive step over any prior art, the independent claim 27 in which a fibre mat of this kind is used must also be considered as involving an inventive step and allowable.

Taking into account the above comments as well as the amended application, we respectfully request that the opinion of the IPEA is reviewed and that novelty and inventive step are recognized. Should the Examiner not be convinced by the above explanations we hereby ask for a second written opinion or a telephone interview with the Examiner before the IPRP (Chapter II) is prepared.

Basis for claim amendments

New claim 1 and 16:

figures 1-2, 4-5, 7-12 and corresponding description.

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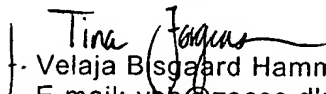
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We look forward to hearing from you.

Yours sincerely,
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